

# Bootstrapping Machine Learning

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Andreas Mueller  
June 6

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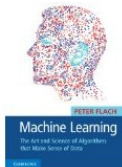
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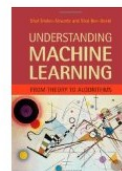
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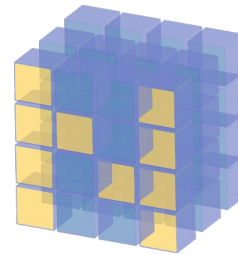


python

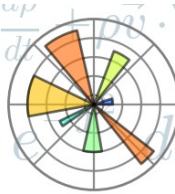
IP[y]: IPython  
Interactive Computing



SciPy



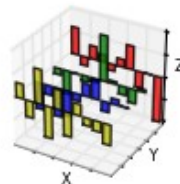
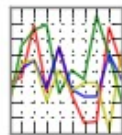
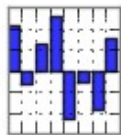
NumPy



matplotlib

pandas

$$y_{it} = \beta' x_{it} + \mu_i + \epsilon_{it}$$



# IP[y]: IPython Interactive Computing

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IP[y]: Notebook Chapter 4 - Working With Text Data. (autosaved)
File Edit View Insert Cell Kernel Help
Code Cell Toolbar: None

In [22]: from sklearn.svm import LinearSVC
svm = LinearSVC(C=0.01)

In [23]: svm.fit(X_train, y_train)

Out[23]: LinearSVC(C=0.01, class_weight=None, dual=True, fit_intercept=True,
intercept_scaling=1, loss='l2', multi_class='ovr', penalty='l2',
random_state=None, tol=0.0001, verbose=0)

In [24]: svm.score(X_train, y_train)

Out[24]: 0.88421586014694709

In [25]: svm.score(X_test, y_test)

Out[25]: 0.83679637325273892

In [26]: y_test_pred = svm.predict(X_test)

In [27]: from sklearn.metrics import classification_report

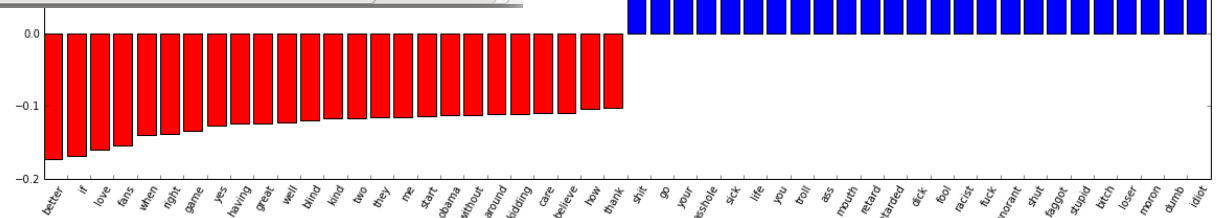
In [28]: print(classification_report(y_test, y_test_pred))

              precision    recall  f1-score   support

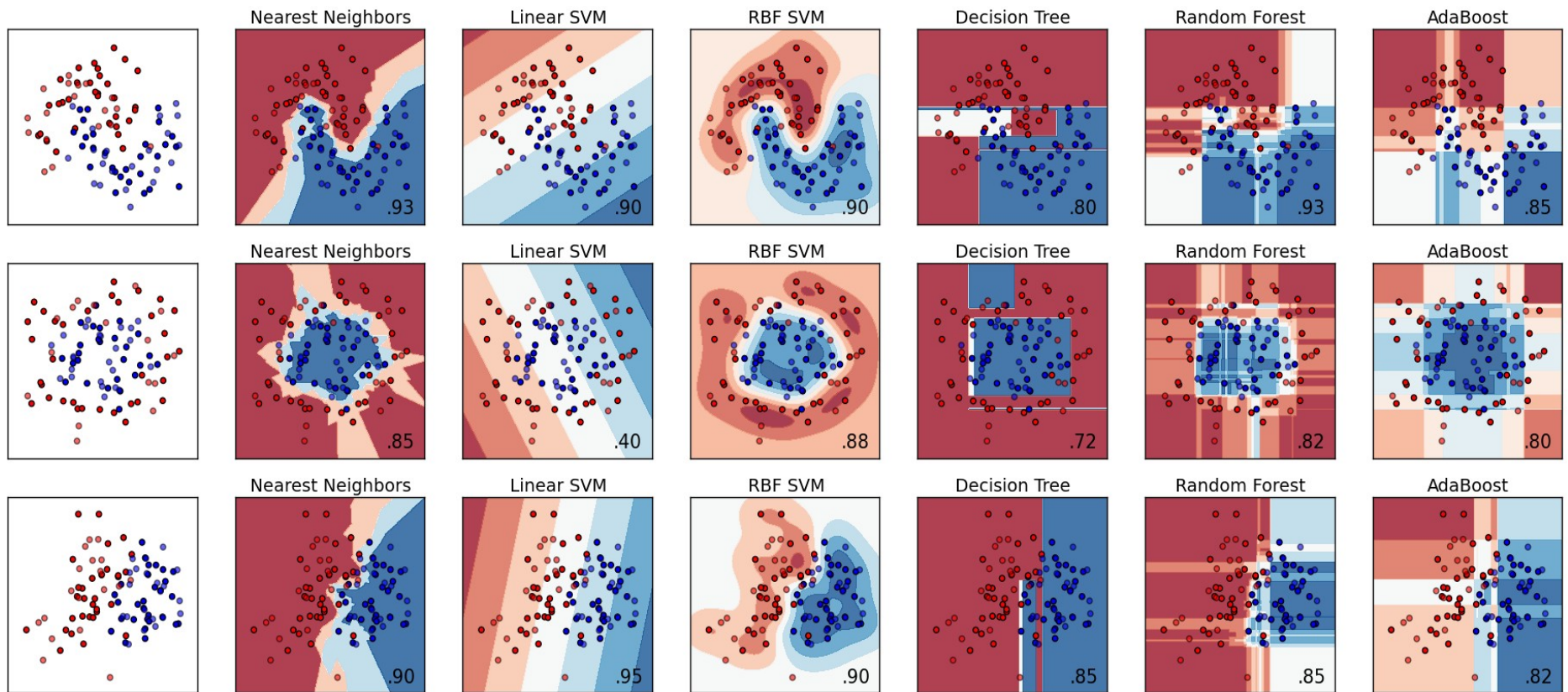
     0       0.84         0.96      0.90       1954
     1       0.82         0.48      0.61        693

 avg / total       0.83         0.84      0.82       2647

In [29]: coef = svm.coef_.ravel()
positive_coefficients = np.argsort(coef)[-25:]
negative_coefficients = np.argsort(coef)[:25]
interesting_coefficients = np.hstack([negative_coefficients, positive_coefficients])
```







lovely



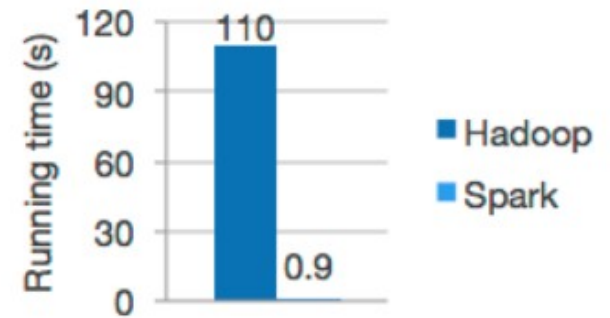
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Logistic regression in Hadoop and Spark

# MLService

predict

# Thank you.

Andreas Müller

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